BY ORDER OF THE
SECRETARY OF THE AIR FORCE

AIR FORCE INSTRUCTION 21-214

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Maintenance

*SPACE LAUNCH MAINTENANCE AND
MISSION ASSURANCE*

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This Instruction implements Air Force Policy Directive (AFPD) 21-2, *Munitions* and AFPD 20-1/63-1, *Integrated Life Cycle Management*. This Air Force Instruction (AFI) establishes procedures for Space Launch (SL) Maintenance and Mission Assurance. It applies to Headquarters Air Force, Air Force Space Command (AFSPC) and subordinate SL units. This publication does not apply to Air National Guard, Air Force Reserve or Civil Air Patrol units. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records,* and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located in the Air Force Records Information Management System (AFRIMS)", or any updated statement provided by the AF Records Management office (SAF/CIO A6P). Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Form 847s from the field through the appropriate functional's chain of command. This publication may be supplemented at any level, but all direct Supplements must be routed to the OPR of this publication for coordination prior to certification and approval. The authorities to waive wing/unit level requirements in this publication are identified with a Tier (T-0, T-1, T-2, or T-3) number following the compliance statement. Subordinate paragraphs carry the parent tiering unless otherwise specified. See AFI 33-360, *Publications and Forms Management*, Table 1.1 for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-tiered compliance items.

SUMMARY OF CHANGES

This Instruction has been completely rewritten with focus on specific management philosophy, guidance and maintenance responsibilities. The document also provides tiering throughout the document to comply with AFI 33-360 requirements. This document contains substantial changes and must be completely reviewed.

Chapter 1

SPACE LAUNCH MAINTENANCE AND MISSION ASSURANCE MANAGEMENT PHILOSOPHY AND GUIDANCE

1.1. Introduction. This Instruction prescribes specific Space Launch (SL) maintenance guidance and procedures to be used throughout the United States Air Force (USAF) and provides senior leadership and management direction for the accomplishment of this mission. This AFI applies to SL maintenance management and mission assurance functions. SL is different from traditional missile maintenance mission areas in that it is a hybrid mission involving aspects of acquisition, operations and maintenance expertise.

1.1.1. Due to the nature of SL, where individual rocket components are physically mated and electrically connected for the first time at the launch base, launch site operations and maintenance operate in an acquisitions environment as the last stop on the factory floor, where there is significant assembly and testing occurring in the weeks and months preceding launch.

1.2. Related Guidance. AFI 21-200, *Munitions and Missile Maintenance Management* contains general information to support Air Force munitions and missile maintenance and provides broad responsibilities for these organizations. Additionally, AFI 63-101/20-101, Integrated Life Cycle Management, requires Mission Assurance to be an integral part of the life cycle of space systems. AFI 21-214, *Space Launch Maintenance and Mission Assurance* is the capstone document for Space Launch maintenance management defining organizational structure and related roles and responsibilities. AFI 10-1211, *Space Launch Operations*, establishes roles and responsibilities relating to space launch and range operations and maintenance, including the launch readiness review process.

1.3. Supervision of Maintenance. All levels of supervision must place emphasis on safety, security, quality and timeliness in the performance of maintenance.

1.4. Space Launch and Equipment Readiness. SL and equipment readiness is the maintenance mission. Maintenance ensures assigned SL and support equipment remains safe, serviceable and properly configured to meet mission needs. Maintenance actions include, but are not limited to, certification, inspection, repair, overhaul, modification, preservation, refurbishment, testing and analyzing condition and performance.

1.5. Critical Ground Support Equipment, Facilities and Infrastructure. Critical Ground Support Equipment (GSE), facilities and infrastructure are those ground systems at the launch base that are necessary for the proper launch or safing of the flight hardware. Their location can vary from umbilical cables and fixed structures co-located at the launch complex that physically support the rocket or supply it with commodities to geographically distant pipelines or power systems that supply critical services.

1.5.1. These systems are separate from range systems necessary for the launch, termination or tracking of all rockets and missiles during flight. Range Maintenance Squadrons at each Space Wing maintain the ranges according to guidelines in other documents.

1.5.2. Critical infrastructure not under the control of satellite or launch vehicle contractors of contractor-leased facilities such as pipelines or electrical distribution systems will be maintained by the appropriate wing agency.

1.5.3. Critical GSE, facilities and infrastructure also includes facilities for storing, processing or commanding flight hardware.

1.5.4. Responsibility for maintenance of contractor-leased/licensed critical infrastructure resides with the contractor. Oversight of contractor-leased/licensed facilities at the launch bases will be provided by the Launch Group (LCG) via applicable Letters of Assignment (LoA) or Memorandums of Agreement (MoA) between the Program Office and the launch base.

1.6. Preventive Maintenance. The purpose of the entire maintenance process is to sustain the capability to support operational mission requirements. To accomplish this objective, the primary focus of the maintenance effort should be on preventive rather than corrective maintenance. Preventive (or scheduled) maintenance ensures equipment is ready and available at the time of need. A conscientious and disciplined approach to preventive maintenance will be the method used to meet that goal safely and effectively. Preventive maintenance concepts are described in T.O. 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Polices, and Procedures*.

1.7. Mission Assurance (MA). MA is an integrated engineering-level assessment of analysis, production, verification, validation, operation, maintenance and problem resolution processes performed over the lifecycle of a program by which an operator/user determines that there is an acceptable level of risk to employment of a system or end item to deliver an intended capability in an intended environment. The objective of the MA process is to identify and mitigate design, production and test deficiencies that could impact mission success. MA is achieved through integrated developmental processes and/or independent technical assessment and requires expenditures commensurate with the criticality of the mission and the consequences of failure. MA activities are conducted by the corresponding Program Office and launch site personnel throughout the system life cycle, and result in the establishment of the mission risk baseline for Space Flight Worthiness Certification and continuing assessment through launch.

1.8. Use of Technical Orders (T. O.), Supplements, Contractor Procedures and Local Procedures. Use of the prescribed technical data to maintain SL systems and associated equipment is mandatory. For SL and satellite processing, contractor procedures for contractor-controlled/owned hardware and software govern mission assurance and maintenance actions.

1.8.1. Supervisors will:

1.8.1.1. Strictly enforce adherence to and compliance with T.O.s, supplements, local procedures and contractor procedures.

1.8.1.2. Ensure availability of required T.O.s, supplements, local procedures and contractor procedures.

1.8.1.3. Ensure all applicable T.O.s are part of unit Technical Order Distribution Office account in order to receive all updates, changes and revisions.

1.8.1.4. Ensure the appropriate Air Logistics Complex (ALC) technical content manager is contacted to obtain information/specifications when T.O.s do not provide enough detail.

1.8.2. All personnel will:

1.8.2.1. Recommend improvements or corrections for T.O deficiencies IAW T.O. 00-5-1, *AF Technical Order System*. Official T.O. updates are the only valid authority for correcting a technical deficiency and implementing change. (T-1)

1.8.2.2. Ensure T.O. files are current and maintained IAW T.O. 00-5-1. Technical data can only be released outside USAF channels IAW T.O. 00-5-19, *Security Assistance Technical Order Program*.

1.8.3. 1st Air and Space Test Squadron (1 ASTS) Local Procedures.

1.8.3.1. Local Procedures required to accomplish the assigned mission when no technical data exists will be developed IAW T.O. 00-5-1 and MAJCOM supplement, as required to conduct SL mission assurance/maintenance as requested by the appropriate program office.

1.8.3.2. Local Procedures will be adhered to and complied with in the same manner as T.O.s when used.

1.8.3.3. AFSPC/A4, in coordination with AFSPC/A3, will establish approval processes for local maintenance operations procedures. (T-2)

1.9. Publications. Air Force SL Systems Maintenance is defined by this Instruction. AFSPC will supplement this AFI or publish a separate instruction IAW AFI 33-360. Units must tailor procedures to the unique aspects of their own maintenance operation and publish directives, instructions, supplements and, for functional areas, operating instructions according to AFI 33-360 where more detailed guidance or specific procedures will ensure a smooth and efficient operation. Adhere to the following procedures:

1.9.1. Do not publish unit instructions or Operating Instructions (OI) to change or supplement T.O.s. Use the authorized procedures in T.O. 00-5-1.

1.9.2. Coordinate local directives, supplements and directives with all appropriate unit agencies, including AFSPC/A4S.

Chapter 2

ORGANIZATION ROLES AND RESPONSIBILITIES

2.1. Headquarters Air Force (HAF)

2.1.1. Air Force Deputy Chief of Staff for Logistics, Installations & Mission Support, Directorate of Logistics, Nuclear Weapons, Munitions and Missile Maintenance Division (AF/A4LW) is responsible for logistics plans and guidance and is the Air Force lead for SL maintenance.

2.1.1.1. AF/A4LW Air Force Career Field Manager (AFCFM) develops munitions, nuclear, missile maintenance, SL and armament systems guidance. They perform duties related to force development including the accession, education and training, retention and optimum utilization of the Active Duty, Reserve, Air National Guard and civilian workforce. The AFCFMs work with members of the Office of the Secretary of Defense, AF Secretariat, Air Staff and MAJCOMs to develop and present Air Force positions on munitions, nuclear, missile, SL and armament maintenance training, and personnel management issues. The AFCFMs conduct Utilization and Training Workshops (U&TW), develop Career Field Education and Training Plans (CFETP) and ensure formal courses are developed to meet field requirements.

2.1.1.2. AF/A4LW personnel execute Functional Area Manager (FAM) duties and responsibilities outlined in AFI 10-401, *Air Force Operations Planning and Execution.* AF/A4LW FAMs develop sourcing, sequencing, prioritization and posturing guidance for the 2M0 community; develop, manage, maintain and identify resources to fill 3-series (aviation), HH-, HG- and 1-series (space & missile) Unit Type Codes (UTC). This will ensure viability of Air Force capabilities as defined within mission capability statements in associated UTCs.

2.1.1.3. AF/A4LW will:

2.1.1.3.1. Develop, articulate and clarify SL maintenance/mission assurance guidance.

2.1.1.3.2. Serve as Air Staff point of contact for matters relating to SL maintenance policy.

2.1.1.3.3. Schedule and chair a World Wide Senior Munitions Manager's Conference (WWSMMC).

2.1.1.3.4. Manage Enlisted Development Teams (EDTs) for 2M0 Air Force Specialties Codes (AFSCs). Developmental Teams will provide course vectors and developmental assignments. They will coordinate with MAJCOM functional managers to develop vectors for personnel management.

2.1.1.3.5. Co-chair U&TWs for 2M0 career fields IAW AFI 36-2201, *Air Force Training Program.*

2.1.1.3.6. Manage/update a CFETP for each applicable Air Force Specialty Code (AFSC).

2.1.1.3.7. Be responsible for overall 2M0 career field health and validate manpower requirements.

2.2. Air Force Space Command. Develops maintenance management guidance and procedures that allow SL and developmental test units to achieve the highest levels of safety, surety, security, readiness and maintenance productivity.

2.2.1. AFSPC will:

2.2.1.1. Participate in accident and safety investigation boards, as required.

2.2.1.2. Ensure units enforce proper maintenance, mission assurance, supply, safety and security procedures.

2.2.1.3. Ensure policies and procedures are standardized between launch groups as much as possible to optimize efficiencies.

2.2.1.4. Ensure command guidance achieves maximum readiness of safe and reliable SL systems, and associated test, handling and support equipment.

2.2.1.5. Assist AFSPC Manpower and Personnel (AFSPC/A1) to determine manpower needs, composition and responsibilities.

2.2.1.6. Validate and advocate personnel, facilities, equipment, technical orders and funding needs.

2.2.1.7. Provide MAJCOM Functional Management (AFSPC/A4S) for all 2M0 AFSC personnel by ensuring all units are optimally manned and trained in accordance with Air Force manpower and training directives.

2.2.1.8. Attend the U&TW and provide inputs to the AFCFM and AETC Training Pipeline Managers in developing/updating the CFETP, Career Development Courses and course training standards (CTS) for formal courses.

2.2.1.9. Coordinate maintenance assist requests from field units with depots IAW T.O. 00-25-107-WA-1, *Maintenance Assistance* and T.O. 00-25-108-WA-1, *Communications-Electronics (C-E) Depot Support.*

2.2.1.10. Serve as voting members for the WWSMMC and U&TW conferences.

2.2.1.11. Coordinate unit requests for Stock Record Account Number/DoD Activity Address Code (DoDAAC) additions, deletions and changes. Valid requests will be submitted IAW AFI 24-230, *Maintaining Air Force DoD Activity Address Codes (DoDAAC).*

2.2.1.12. Review Capability Production Documents to ensure life-cycle sustainment and T.O. accuracy are adequately addressed.

2.2.1.13. Coordinate T.O. requirements and changes in acquisition and modification programs.

2.2.1.14. Review, validate and coordinate unit Engineering Technical Assistance Requests (ETAR) and Maintenance Assistance Requests.

2.3. Fourteenth Air Force (14 AF). Manages AF space forces to support operational plans and missions for U.S. combatant commanders and air component commanders. As the sole

Numbered Air Force (NAF) for space, 14 AF is the Air Force space task force for U.S. Strategic Command.

2.3.1. Fourteenth Air Force will:

2.3.1.1. Advise NAF/CC and subordinate units on SL maintenance policies and processes supporting launch base infrastructure, booster and DoD, civil and commercial satellite programs.

2.3.1.2. Serve as focal point for maintenance and readiness issues between space wings and AFSPC.

2.3.1.3. Team with HQ AFSPC, SMC, 30 SW and 45 SW for SL maintenance and MA issues.

2.3.1.4. Review, implement and supplement launch and range operational and contingency policies and requirements established by DoD, AF and AFSPC directives and instructions.

2.3.1.5. Review, coordinate and supplement SL guidance and concept documents, as required.

2.3.1.6. Validate operational requirements, conceptual documents and situation report status.

2.3.1.7. Provide assistance to subordinate units on compliance issues when resolution is beyond their scope and/or resources.

2.3.1.8. Participate in Staff Assistance Visits, Tiger Teams and Readiness Visits to launch and range units, as required, or at SW request. These visits must be coordinated through applicable MAJCOM/Wing Gatekeepers.

2.3.1.9. Provide resources and participate in Safety Investigation Boards and Accident Investigation Boards, as required by the board President.

2.3.1.10. Ensure standardization of Spacelift maintenance, mission assurance and training across units.

2.4. Space and Missile Systems Center (SMC). A subordinate unit of AFSPC, is responsible for research, development, acquisition, fielding, sustainment management, logistics support, depot level maintenance and disposal of assigned military SL systems, to include space segment, command and control segment and ground/terminal/user segment. Additional responsibilities of the center include Chief Financial Officer (CFO) reporting IAW AFI 21-103, *Equipment Inventory, Status and Utilization Reporting*. The center is also responsible for on-orbit check-out, testing, sustainment and maintenance of military satellite constellations and other DoD SL systems. SMC will:

2.4.1. Assign launch site mission assurance responsibility to the LCGs through the program office LoA and/or delegate contractual responsibilities through the program office Letter of Delegation (LoD). LoAs and LoDs will be coordinated through AFSPC/A4 and courtesy copied to 14 AF/A4. (T-2)

2.4.2. Approve contractor data for use by Air Force personnel conducting maintenance operations (munitions loading, handling, etc.), when T.O.s are not available.

2.4.3. Perform CFO reporting responsibilities as outlined in AFI 21-103.

2.5. Space Wings (SW). Follow maintenance management guidance and procedures to achieve the most efficient use of manpower and fiscal resources, safety, readiness and maintenance productivity. Implement policies and supplement guidance/requirements established by DoD, AF, AFSPC and SMC directives and instructions. The Space Wing Commander will integrate safety, security, environmental compliance and resource protection responsibilities described in this document with other wing units.

2.6. Launch Group. Provides mission assurance for receipt, inspection and processing (generation) of Launch Vehicle (LV) and Space Vehicle (SV) flight hardware and oversees sustainment and readiness of all launch support facilities to include processing and launch facilities. Support the program offices with the establishment of new/emerging launch or satellite vehicle operations, as directed.

2.6.1. Small and Unique Organizational Structure. Some activities cannot meet typical organizational structure due to limited manpower, unique mission or operational requirements.

2.6.2. Criteria for a small unit organizational structure:

2.6.2.1. Have fewer than 60 authorized full time personnel.

2.6.2.2. Aligned directly under a parent group or squadron as a flight, section or element.

2.6.2.3. Provide sole support for activities on an installation or for the parent MAJCOM.

2.6.3. Criteria for a unique unit organizational structure:

2.6.3.1. Have a unique function (e.g. Air Force Research Laboratory, Flight Test Squadron, Launch Group).

2.6.3.2. Does not fall within another organizational structure noted in this Instruction.

2.6.3.3. Organization structure codes will be recommended by AF/A4LW and approved by AF/A1MO.

2.7. Launch Group Commander (LCG/CC). In addition to responsibilities outlined in AFI 21-101 and AFI 21-200, the LCG/CC will:

2.7.1. Provide launch site engineering and acquisition assessments to the program office in support of the establishment of new/emerging launch/satellite vehicle operations, as directed.

2.7.2. Ensure subordinate squadron commanders properly execute all assigned/delegated responsibilities. Assign Mission Assurance, maintenance and support functions delegated by the vehicle program office to appropriate squadron by system.

2.7.2.1. Conduct mission assurance on behalf of the program office. Provide launch site on-scene technical expertise to support wing processing and launch operations based on assignments and delegated authorities from SV and LV programs. (T-2)

2.7.2.2. Ensure subordinate units support program offices' execution of Life Cycle Engineering Processes outlined in AFI 63-101/20-101 including coordinated waivers/exceptions.

2.7.2.3. Perform launch processing surveillance. (T-2)

2.7.2.3.1. Ensure personnel and resources providing launch processing surveillance, integration and other associated activities are utilized to ensure DoD interests are met. Any non-DoD use of these resources must not interfere with launch mission requirements. The LCG/CCs will support commercial and non-federal customers to the fullest extent possible, as prescribed by current policy and allowed by law.

2.7.2.3.2. Monitor and assess processing and integration tasks, current processing schedules, critical path items and the potential risks to maintaining them. Report risk areas or anomalous events to the program office and coordinate with contractors to mitigate risks, as appropriate. (T-3)

2.7.3. Develop and maintain an effective quality assurance program that complies with the requirements in **Chapter 5**. (T-1)

2.7.4. Ensure development of strategic/long range plans for optimization of LV/SV processing capabilities (e.g. facility utilization, capital upgrades, divestitures, forecasting future needs, etc). (T-2)

2.7.5. Advocate for manpower, personnel, budget and facility resources to meet current and long term plans. (T-2)

2.7.6. Conduct Launch Group Readiness Reviews prior to processing milestones and report assessments to the program office. (T-2)

2.7.7. Provide guidance, oversight and support to ensure training programs are implemented, administered, maintained and standardized for all personnel IAW Chapter 4 (T-1)

2.7.8. For civil and commercial missions, LCG will ensure resource protection for assigned critical launch facilities and GSE. (T-1)

2.7.9. Ensure management of the unit maintenance T.O. system, as required. (T-1)

2.7.10. Ensure local emergency action procedures/checklists for assigned personnel are published. (T-1)

2.8. Space Launch Squadrons (SLS). The SLS will:

2.8.1. Provide on-site representation, acquisition management, engineering and direct support for satellite system program offices and for the Launch System Program Office, as assigned. (T-2)

2.8.2. Provide mission assurance, analysis and support through risk evaluation and assessment and monitoring of vehicle processing and countdown at the launch site.

2.8.3. **(30 SW)** Conduct oversight for spacecraft processing to include performing technical surveillance for mission assurance, as required. (T-1)

2.8.4. Provide management and oversight/mission assurance (as applicable) on the operations, maintenance and upgrade of mission critical facilities/infrastructure. (T-1)

2.9. Launch Support Squadron (45 SW). Launch Support Squadrons will:

2.9.1. Provide on-site representation, acquisition management, engineering and direct support for satellite system program offices. (T-1)

2.9.2. Conduct oversight for spacecraft processing to include performing technical surveillance for mission assurance based on letters of assignment. (T-1)

2.9.2.1. Be responsible for mission assurance on the operations, maintenance and upgrade of mission critical infrastructure. (T-1)

2.10. Air and Space Test Squadron (30 SW). Supports both assured access to space and capabilities-based test and evaluation for the Advanced Systems & Development Directorate and other customer launch campaign operations

2.10.1. Perform mission assurance, transportation, handling, range/facilities integration and Day of Launch execution, as assigned, through campaign integration, program support, risk assessment and Air Force maintenance operations. (T-1)

2.11. Squadron Commander (or equivalent). In addition to responsibilities outlined in AFI 21-200 and AFI 21-101, Squadron Commanders will:

2.11.1. Provide Launch Vehicle Mission Assurance (LVMA)/Satellite Vehicle Mission Assurance (SVMA) of assigned LV/SV program(s) and infrastructure through risk assessments and engineering analysis. (T-1)

2.11.2. Support program offices' overall Life Cycle Systems Engineering as outlined in AFI 63-101/20-101. (T-1)

2.11.3. Monitor and assess processing and integration tasks. (T-2)

2.11.4. Provide management and oversight of assigned LV processing / oversight of assigned SV processing and integration facilities, launch control centers, launch sites, GSE and other launch preparation/execution support facilities/infrastructure. (T-2)

2.11.5. Develop mission assurance task coverage priorities and verification processes. (T-2)

2.11.6. Assess launch contractor GSE, facilities and infrastructure sustainment and modernization requirements. Provide recommendations to respective program office and launch group commander. (T-2)

2.11.7. Ensure personnel are qualified to perform assigned duties as prescribed in this Instruction. (T-1)

2.11.8. Ensure all upgrade training requirements listed in the CFETP and Master Task List are met prior to upgrade approval, IAW AFI 36-2201. (T-1)

2.11.9. Ensure assigned SL facilities sited for explosives storage, inspection and maintenance are used for their intended purpose. (T-1) Ensure waiver or deviation requests for explosive sited structures used for other than their intended purpose are forwarded to MAJCOM for approval. (T-2) Refer to AFI 32-9002, *Use of Real Property Facilities* and AFI 21-201, *Conventional Munitions Maintenance Management,* for additional guidance. Ensure facilities are maintained and inspected at the required intervals IAW AFI 32-1065, *Grounding Systems,* and AFMAN 91-201, *Explosives Safety Standards.* (T-1)

2.11.10. Establish work center pre-task briefing and debriefing procedures. (T-2)

2.11.11. Perform post-operation reviews and develop/maintain lessons learned. (T-2)

2.11.12. Assign a corrosion control manager for DoD owned/LCG managed facilities assigned to the unit. (T-2)

2.11.13. Coordinate with QA to ensure a viable quality assurance program has been implemented which complies with the requirements in Chapter 5. (T-1)

2.11.14. Implement a self-inspection program IAW AFI 90-201, *The Air Force Inspection System* (T-1)

2.11.15. Ensure personnel scheduling accomplishes mission requirements while ensuring compliance with crew rest and maximum work shift/scheduling requirements established in MAJCOM guidance and EWR 127-1, *Eastern Western Range Safety Requirements* (T-0)

2.11.16. Identify/report Space Mishaps and events that require safety investigations and reports as outlined in AFI 91-204, *Safety Investigations and Reports* and AFMAN 91-222, *Space Safety Investigations and Reports*. (T-1)

2.11.17. Enforce the Foreign Object Damage (FOD) program and drop mitigation practices IAW local contractor procedures and MAJCOM guidance or EWR 127-1, *Eastern and Western Range Safety Requirements* as applicable. (T-1)

2.11.18. Support test and integration functions for experimental space vehicles, spacelift vehicles, targets and interceptors (National and Theater Missile Defense), as directed. (T-0)

Chapter 3

MISSION ASSURANCE AND MAINTENANCE POSITIONS, ROLES AND RESPONSIBILITIES

3.1. Mission Assurance Technician (MAT): Mission Assurance Technicians provide the technical insight for the government on contractor launch processing activities, utilizing experience from previous AF missile/munitions tours. Specifically, MATs are able to leverage time spent adhering to technical requirements and best maintenance practices to provide a critique of contractor processing activities with an eye on procedural compliance and safety.

3.1.1. Perform technical observations on tasks where electrical, mechanical, lifting, fueling or transport based physical tasks are occurring. (T-1)

3.1.1.1. Observe processing activities to ensure adherence to technical procedures, general maintenance practices, and proper use of associated special tools and equipment. (T-1)

3.1.2. Observe contractor launch processing activities and ensure compliance with safety directives, security measures, environmental standards, and resource protection directives. (T-1)

3.2. Air Force Responsible Engineer (AFRE): AFREs perform activities to ensure the perational safety, suitability and effectiveness of the system IAW AFI 63-101. They provide analysis of procedures, processing activities for technical risk assessment and verify these products and procedures are technically accurate with an emphasis on protection of critical vehicle hardware, GSE, facilities, and infrastructure capabilities to ensure the operational safety, suitability, effectiveness assigned by the Program Office IAW AFI 63-101. The AFREs work in concert with Federally Funded Research and Development Centers or other contracted engineering support to provide government insight into launch services. AFREs will:

3.2.1. Observe launch processing activities, review procedures, provide technical risk assessments for mission assurance through engineering analysis, and assess compliance with safety directives, security measures, environmental standards, and resource protection directives. (T-1)

3.2.2. Observe critical launch processing activities, on-site and on-console, with an emphasis on procedure accuracy, data analysis, nonconformance work, anomaly resolution, technical risk, and protection of critical vehicle hardware, GSE, facilities, and infrastructure capabilities. Additionally, perform MAT duties as outlined by para 3.1, as required.

3.3. Space Launch Maintenance Technician (SMT): SMTs provide maintenance, handling, transportation and emplacement of small lift launch boosters. SMTs work in concert with aerospace contractors in support of responsive space capabilities and other near-term defense technology development programs.

3.4. Facilities Infrastructure Manager (FIM): FIMs fulfill a vital role in the readiness and sustainment of mission critical ground systems of launch processing facilities both under the control and not under the control of contractors as well as base infrastructure not under contractor control. Critical infrastructure under the control of satellite or launch vehicle contractors include, but are not limited to, facility cranes, environmental control systems and fire

detection/suppression systems. Critical infrastructure not under the control of satellite or launch vehicle contractors include, but are not limited to, base-wide power production/distribution, commodity pipelines and water pump stations. FIMs assist launch group leadership in providing launch and sustainment risk assessments to associated program offices. FIM oversight responsibilities include tasks that are typically performed by third party contractors and are not assigned a Launch Verification Database mission assurance category.

Chapter 4

TRAINING

4.1. General Requirements. Training managers/supervisors/trainers will schedule, monitor and control the various training programs IAW applicable training directives and guidelines to provide management with trained personnel to meet mission requirements.

4.1.1. 2M0XX Senior Noncommissioned Officers, who are qualified on and performing technical tasks (e.g. technician, team chiefs, instructors, evaluators), will maintain CFETPs within the Training Business Area. (T-1)

4.1.2. **Performance-based training should be used to the maximum extent possible.** Comprehensive MAT/AFRE/FIM/SMT OJT shall encompass appropriate classroom, controlled scenario-based, simulator, and SV/LV operations, as appropriate to support position qualification. (T-2)

4.2. Training Section Responsibilities:

4.2.1. Develop, manage and document unit training programs IAW AFI 36-2201 and **Attachment 2, MAT/AFRE/SMT/FIM Training Requirements.** (T-1)

4.2.2. Schedule/track contractor-provided training, as required. (T-2)

4.2.3. Develop lesson plans and local training programs IAW AFMAN 36-2236, *Guidebook for Air Force Instructors*. (T-1)

4.2.4. Review lesson plans upon creation and annually thereafter (not to exceed 12 months between reviews) for technical accuracy and Instructional System Development (ISD) compliance. (T-1)

4.2.5. Establish, implement and manage initial and recurring training (RT) programs. (T-1)

4.2.5.1. Initial Training: Initial training imparts individuals with the knowledge and skills necessary to perform MA and SL maintenance activities including, but not limited to, launch verification activities and technical risk assessments of the LV, SV and critical facilities, as well as Rocket System Launch Program (RSLP) activities.

4.2.5.1.1. Establish an initial training program for all newly assigned MAT, FIM, AFRE & SMT. (T-1) In addition to the requirements in Attachment 2, ensure training contains the following:

4.2.5.1.2. Applicable Systems Specific Training on which the member is assigned to (e.g., Minotaur, Atlas V). (T-2)

4.2.5.1.3. Launch site specific training on the facilities and infrastructure. (T-2)

4.2.5.1.4. Background training on the mission assurance program, doctrine and purpose. (T-2)

4.2.5.1.5. System specific launch processing flow training. (T-2)

4.2.5.1.6. Critical processing tasks training. (T-2)

4.2.5.2. Recurring Training: RT provides "refresher" job related training to those personnel qualified to perform assigned duties in their appointed position(s). RT emphasizes knowledge and skill deficiencies identified through feedback and provides the medium for knowledge enhancement training. RT sustains a person's knowledge of job related tasks and the work environment.

4.2.5.2.1. Ensure RT is conducted quarterly on all MATs, AFREs, FIMs and SMTs. (T-1)

4.2.5.2.2. Tailor program to individual and unit needs. (Ancillary training does not meet the intent of the RT program.) (T-2)

4.2.5.2.3. Consider QA observed findings and lessons learned in RT. (T-2)

4.2.6. Notify QA once a trainer is ready to assume or is no longer performing trainer duties. (T-2)

4.3. Trainer Qualifications. Prior to performing unsupervised trainer duties, personnel selected as trainers must meet the following requirements:

4.3.1. Comply with trainer responsibilities IAW AFI 36-2201. (T-1)

4.3.2. Complete a MAJCOM sponsored instructor course (i.e. 20 AF ICBM Center of Excellence - Instructional Techniques Course) covering fundamentals of instruction, instructional development and instructional presentations. (T-3) This requirement can be waived by the unit CC on a case by case basis.

4.3.3. Be observed conducting training by Training Management. (T-2)

4.3.4. Be appointed by unit CC, or designated representative, after completing training and trainer qualification requirements. (T-1)

4.3.5. Be observed conducting training by QA IAW Table 5.1. (T-1)

Chapter 5

QUALITY ASSURANCE

5.1. General. The Quality Assurance (QA) program is designed to standardize and improve processes, assess personnel proficiency, ensure effectiveness of space launch maintenance management and provide feedback to supervision. The evaluation and analysis of deficiencies and problem areas are key functions of QA that highlight and identify underlying causes of poor quality and processes. The LCG/QA section may use Staff Assistance Visits, Inspections and Reports as tools to ensure quality maintenance, processes and programs.

5.1.1. QA is the Group commander's program to assess effectiveness of maintenance management and mission assurance processes and personnel, identify deficiencies and problem areas and recommend improvements to group-wide processes.

5.2. Responsibilities.

5.2.1. Serve as the group commander's liaison between units, SMC, 14 AF and AFSPC for policy and guidance. (T-2)

5.2.2. Review and coordinate new, revised and changed instructions and policies affecting SL maintenance management and mission assurance. Inform LCG/CC and affected squadron(s) of publication changes. (T-2)

5.2.3. Ensure standardized development and implementation of LCG policies, procedures, instructions and training. (T-2)

5.2.4. Assist the training sections and work center supervisors in identifying training requirements. (T-2)

5.2.5. Chair an annual local CFETP Review Board consisting of all affected work centers. (T-2) The review board will:

5.2.5.1. Review CFETPs and local Job Qualification Standards (JQS) for adequate coverage, changes and currency. (T-2)

5.2.5.2. Ensure training tasks not identified in the CFETP are documented on a JQS. (T-2)

5.2.5.3. Submit CFETP and JQS changes to AFSPC/A4S. (T-2)

5.2.6. Review all unit-managed lesson plans annually for adequacy and format. (T-2)

5.2.7. Conduct the QA Orientation briefing. (T-2)

5.2.7.1. AFRE/MAT/FIM/SMTs and trainers who are evaluated under the QA program will receive the QA Orientation briefing prior to the first evaluation. QA will provide the briefing, with emphasis on the purpose of the program, procedures, error criteria and grading standards. QA will schedule the briefing and ensure completion is documented. (T-2)

5.2.8. Conduct evaluations of all MAT/AFRE/trainers and FIMs (as required) annually, not to exceed 12 months between evaluations. (T-1) Use evaluations to assess personnel/trainer proficiency.

5.2.9. Document evaluations and identify rating IAW **Table 5.2** criteria. (T-1) As a minimum, document rating, strengths, weaknesses and areas of concern, as well as make recommendations for improvements in evaluation reports.

5.2.10. Forward evaluation reports to applicable work center(s) for review and comments. (T-2)

5.2.11. QA personnel, task qualified or not, must stop, correct, alert appropriate agencies and render an evaluation report for any of the following deviations (actual or possible): significant security violations or safety deviations that could result in serious injury to personnel, and deviations that could result in potential/imminent serious equipment damage. (T-1) This intervention applies to any individual on any task.

5.2.12. Conduct random inspections on squadron processes and/or programs (e.g. corrosion, commander's safety, training programs, etc.). (T-1)

5.2.13. Provide sanitized quarterly cross-feed reports from inspections to 30 and 45 LCG/QA, SMC/LRSW, 14 AF/A3/A4, and AFSPC/A4S. (T-2)

5.2.14. Develop procedures for and coordinate the LCG unsatisfactory board. A board will be held for all unsatisfactory ratings given. The board will include an overview of the unsatisfactory evaluation, technician(s)/team evaluation history and review of the unit's related unsatisfactory ratings for trends and possible underlying causes to determine corrective action. (T-2)

5.3. Proficiency Evaluations/Inspections. QA personnel help ensure quality maintenance by conducting and documenting proficiency evaluations/inspections. The following types of evaluations, inspections and observations are available to support the QA program: Proficiency Evaluations (PEs), Quality Verification Inspections (QVIs), Hardware Equipment Inspection, Hardware Acceptance Inspection, Special Inspections (SIs), Management Inspection (MIs), Detected Safety Violation, Technical Data Violations, Unsafe Condition Reports and when directed, other inspections. Refer to **Table 5.1** for minimum requirements. (T-1)

5.3.1. Proficiency Evaluations (PE). A PE is an over-the-shoulder evaluation of a maintenance/ mission assurance action, inspection or training conducted/performed by an individual or team. Use PEs to evaluate job proficiency, degree of training and compliance with T.O./procedure, determine the accuracy and efficiency of technical procedures/processes, assess compliance with T.O.s/procedures and other directives, and accurately document results of evaluations. Individuals performing, supervising or evaluating maintenance/mission assurance tasks are subject to a PE. (T-1) Proficiency evaluations include: Evaluator Proficiency Evaluations (EPE), Trainer Proficiency Evaluations (TPE) and Personnel Proficiency Evaluations (PPE). Rate PEs based on established Acceptable Quality Limits (AQL)/standards listed in **Table 5.2**. (T-1) Document and route the PE IAW locally developed procedures. Ensure a PE is accomplished on all MATs/SMTs/AFREs/Trainers and FIMs (as required) IAW **Table 5.1**. (T-1)

5.3.1.1. The PPE may include an evaluation of the individual's training records, tool box, Test Measurement Diagnostic Equipment and T.O.s/procedures. The evaluation starts when the individual or team begins the task, or portion of the task to be evaluated, and is completed when the job or previously determined portion of the task is finished. When performing an evaluation, the evaluator determines if the technician or supervisor

performed the job IAW T.O./procedure and appropriate instructions. Provide feedback to the individual or team and supervision upon completion. (T-2) The types of PEs are:

5.3.1.1.1. Individual Evaluations. This is a QA over-the-shoulder evaluation of a AFRE/MAT/SMT and FIMs (as required) or supervisor performing a technical/mission assurance task. The evaluator may start or stop the task evaluation at any step. PEs may be performed on individuals working alone or as part of a team. Evaluations must accurately assess the proficiency of each individual under evaluation.

5.3.1.1.2. Team Evaluations. This is a QA over-the-shoulder evaluation of AFRE/MAT/SMT and FIMs (as required) and supervisors performing a team task. A team task is one requiring more than one person to complete the task. The evaluator may start or stop the task evaluation at any step.

5.3.1.1.3. Trainer Proficiency Evaluation (TPE). The TPE is an over-the shoulder evaluation of the trainer, performed while the trainer is conducting qualification/certification/recurring training. A TPE is the direct evaluation of a unit instructor/trainer to determine their ability to teach accurately and sufficiently. TPEs also assess system, equipment or process knowledge; teaching methods and techniques; the ability to operate trainers; and adequacy and effectiveness of training program and not the proficiency of the trainees themselves.

5.3.1.1.4. Evaluator Proficiency Evaluation (EPE). The Chief of QA, QA Superintendent or LCG Superintendent knowledgeable of applicable task requirements will perform EPEs on QA evaluators annually. Each QA evaluator must pass an EPE prior to performing unsupervised evaluations or inspections. Evaluators that fail an EPE, or are overdue their annual EPE, will be restricted from performing proficiency evaluations unsupervised. EPEs will be documented on an AF Form 2419, *Routing and Review of Quality Control Reports*, or equivalent, in the same manner as other PEs. EPEs must be tracked in local QA database.

5.3.1.2. Rating Proficiency Evaluations. QA rates each evaluation based on AQLs/standards. An unsatisfactory PE rating means the specific task was not performed within the established AQL/standards. The rating applies only to the specific task evaluated and not to other tasks that a AFRE/MAT/SMT and FIMs (as required) or supervisor is qualified to perform. Upon completion of an unsatisfactory evaluation, the evaluator must provide on-the-spot feedback. (T-2) Determine ratings IAW Table 5.2.

5.4. General Proficiency Evaluation Guidelines:

5.4.1. QA evaluators will be qualified IAW section 5.9 of this document. (T-2)

5.4.2. To the maximum extent possible, before conducting a PPE, EPE or a TPE, verify the AFRE/MAT/SMT/instructor or FIM (as required) is qualified in the CFETP to perform/instruct the maintenance/mission assurance task. (T-2)

5.4.3. Whenever possible, evaluators will have their own copy of T.O./procedure available for the task being evaluated. (T-2)

5.4.4. Consider using no-notice evaluations whenever possible. QA will attempt to minimize impacts on operational maintenance/mission assurance while scheduling evaluations. (T-2)

5.4.5. QA may perform evaluations on personnel utilizing trainers or training facilities. (T-2)

5.4.6. Evaluators will not be part of the task being performed. (T-2)

5.5. Guidelines for Conducting Proficiency Evaluations:

5.5.1. Evaluators must afford reasonable opportunity for maintenance technicians to detect a defect or deficiency. (T-2)

5.5.2. Evaluation will be accomplished only while observing actual task performance or inspecting equipment or documentation. (T-2)

5.5.3. Evaluators will brief all personnel to be evaluated prior to the start of the evaluation to include how the individual or team on the evaluation and how it will be rated. If a task is already in progress, notify the individuals being evaluated that they are under evaluation and brief them as soon as possible. (T-2) During the briefing, the evaluator must advise the technicians of the following:

5.5.3.1. Do not compromise safety or security.

5.5.3.2. Take breaks during the evaluation, if needed.

5.5.3.3. The evaluator must be notified of any policy, procedure, configuration changes, simulations or previously accomplished steps affecting the evaluation. Errors may be assessed for T.O./procedure requirements that are omitted during task performance that have not been identified as previously accomplished.

5.5.3.4. The AFRE/MAT/SMT and FIMs (as required)is responsible for tasks and related actions. All reports, forms, parts requisition, T.O.s, contractor data/procedures, tools, test and handling equipment availability, or any other task related actions are responsibilities of the individuals evaluated. The evaluator's presence does not shift this responsibility.

5.5.3.5. The AFRE/MAT/SMT and FIMs (as required) may ask for technical help from personnel/agencies normally available in the conduct of day-to-day maintenance/mission assurance activities. The evaluator conducting the evaluation should be asked only as a last resort and when all other avenues of help have been exhausted. Excessive outside intervention that demonstrates a lack of technical/task proficiency to the degree that the task cannot be completed without direct supervisory involvement may result in the task being rated unsatisfactory.

5.5.3.6. The evaluator must be notified of the start and completion of the task and any delays that occur.

5.5.3.7. Evaluator may ask questions to determine the individual's knowledge of the task under evaluation. Individuals may refer to technical guidance or use their normal supervisory chain of command when answering questions.

5.5.3.8. Evaluators will stop a task immediately if conditions are detected that would jeopardize personnel or safety, security, system reliability and/or cause equipment damage.

5.5.3.9. All actions performed are subject to evaluation.

5.5.4. Following the evaluation, the evaluator must critique the technicians on the portion of the task they were evaluated on. The evaluator must inform the work center supervisor when a task is rated unsatisfactory or the results have not been determined. (T-2)

5.5.4.1. Explain each error; include who received it, category, mission impact and correct procedures.

5.5.4.2. Review the AFRE/MAT/SMTs/instructors or FIMs (as required) strengths and weaknesses.

5.5.4.3. Recommend methods of task improvements.

5.5.5. During the TPE briefing, the evaluator must advise the instructor of the following additional items:

5.5.5.1. The instructor must prevent/immediately correct any of the following: significant security violations or safety errors which could result in serious injury to personnel, failure to use T.O.s/procedures during the maintenance/mission assurance process and any error which could result in potential/imminent equipment damage. (T-2)

5.5.5.2. The instructor must correct other errors before completing the training session. The training session is considered complete when the instructor critiques the student's performance. (T-2)

5.5.5.3. Evaluators will consider the instructor's degree of control over the trainee. (T-2)

5.5.5.4. Evaluators will not generate an evaluation report on the trainees. Errors committed by JQS qualified AFRE/FIM/MAT/SMTs during activities performed outside the scope of the training objective may be documented. (T-2)

5.5.5.5. The evaluator may ask questions to determine the evaluatee's knowledge of a task. The evaluatee may use technical references to answer any questions. (T-2)

5.5.5.6. The instructor must complete all applicable training documentation and make it available for the evaluator's review. (T-2)

5.5.5.7. A TPE will be rated unsatisfactory when the trainer does not detect, correct or provide retraining for an error committed that is described in **Table 5.3**. (T-2) Additionally, the evaluation will also be rated unsatisfactory if an incomplete training process takes place.

5.5.6. During task evaluation; the evaluator must detect and correct all errors. (T-2) Select the best option available to correct the situation. It may be advantageous to correct minor errors during the critique phase; other errors may warrant prompt correction. Consider giving AFRE/FIM/MAT/SMT(s) the opportunity to make decisions on courses of action on their own using the resources available to them. (T-2)

5.5.7. For each error, conduct training to the level necessary to ensure the technician understands the circumstances in question. (T-2) The evaluator may be prohibited from

conducting training by time, resources, attitudes or a combination of factors. If prohibited, note the situation in the report and defer the required training action to the section Noncommissioned Officer in Charge (NCOIC).   The evaluator may recommend the AFRE/FIM/MAT/SMT should not perform the task until retrained. (T-2)

5.5.8. Apply the following guidelines when an AFRE/MAT/SMT/FIM cannot correctly or safely do or observe a task without excessive outside intervention or assistance:

5.5.8.1. Notify the AFRE/MAT/SMT's work center and SQ CC/CCS. (T-2)

5.5.8.2. QA and the AFRE/MAT/SMT/FIM's SQ CC and/or CCS will assess whether to:

5.5.8.2.1. Replace the technician(s) on the spot.

5.5.8.2.2. Supervise the AFRE/MAT/SMT(s) finishing the task.

5.5.8.2.3. Terminate the task (SMT only).

5.5.8.3. Do not allow the AFRE/MAT/SMT/FIMs to perform the task in question unless supervised by a task-qualified technician or until retrained. (T-2)

5.5.8.4. State in the evaluation report the technician(s) should not perform the maintenance/mission assurance task unsupervised or until retrained. QA may state the AFRE/MAT/SMT/FIM should not perform any maintenance/mission assurance tasks or any maintenance/mission assurance function unsupervised. (T-2)

5.5.9. AFRE/MAT/FIM/SMT/instructors who commit major errors described in **Table 5.3** at anytime during the maintenance process will be rated unsatisfactory. (T-1)

5.5.10. Conduct TPEs to verify the technical accuracy and completeness of training. Use TPEs to sample both initial qualification and recurring training. (T-1)

5.6. Quality Verification Inspections (QVI). A QVI is an inspection of equipment condition, or a process, an assessment following an inspection, servicing or repair action, or verification that a AFRE/MAT/FIM/SMT or supervisor properly completed an inspection or repair action. QVIs shall not be conducted after equipment operation when such operation could invalidate indications of proper job accomplishment.   Limit QVIs to the T.O.s required for the job. Normally this inspection does not require disassembling parts, removing stress panels or like actions. The QVI report should reflect deficiencies by the individual who accomplished the task and identify specific discrepancies. Each QVI is chargeable to the technician or supervisor who performed the work.

5.7. Management Inspections and Special Inspections. QA conducts inspections to provide managers an objective appraisal of mission capability and management effectiveness. Focus on efficiency, procedural compliance and adequacy of directives.

5.7.1. Management Inspection (MI).   Perform these inspections to follow-up on trends, conduct investigations or conduct research to get to the root cause of problems. Group/CC, SQ/CC or work center supervisors may request MIs. MIs may encompass trends and other inspection data; high component or system failure rates; suspected training deficiencies, and tasks outlined in T.O.s/procedures.   Report MI results to the requester, and allow them latitude to explore options prior to implementing corrective actions. MIs can be non-rated and may be counted in QA trends.

5.7.2. Special Inspections (SI). SIs are inspections not covered by QVIs, PEs or MIs. SIs may include, but are not limited to, aerospace equipment and equipment forms inspections, document file inspections, Composite Tool Kits, T.O. files, vehicle inspections, housekeeping, safety practices, etc. SIs may be condition, procedural or compliance oriented. SIs will be documented in the QA database. SIs can be non-rated. If rating a SI, rate them based on locally established AQLs/standards.

5.7.3. Prior to conducting inspections, determine the scope (what to inspect) and process (how to inspect it). Consider the following:

5.7.3.1. Using formalized checklists.

5.7.3.2. Basing inspections on regulatory requirements.

5.7.3.3. Standardizing report content, format, distribution and routing procedures.

5.8. Applicability to Contract Maintenance Activities. QA is not applicable to contract logistics activities unless required by the Statement of Work, Performance Work Statement or contract (e.g contractor provided training).

5.9. Manning, Training, Qualification and Proficiency.

5.9.1. Chief of QA will develop a local training plan to train all QA personnel to include QA evaluator augmentees. (T-1)

5.9.1.1. Training must cover inspection and evaluation techniques, documenting inspection worksheets and actions to prevent personnel injury or equipment damage. A formal QA evaluator course may be used to supplement this training. Document QA evaluator training in individual training records. (T-2)

5.9.1.2. QA evaluators must be JQS qualified on all SMT tasks they evaluate. (T-1) For all other tasks, evaluators must be familiar with the requirements/procedures of tasks they evaluate. (T-2)

5.9.1.3. QA may need augmentee evaluators for some work centers. Ensure augmentees are qualified on the appropriate SMT technical tasks in the CFETP they will evaluate. (T-1) Permanent augmentees will meet all qualifications required for QA. (T-1)

5.9.1.4. Evaluator Qualifications: Prior to performing unsupervised evaluator duties, personnel selected as evaluators or evaluator augmentees must:

5.9.1.4.1. Be JQS qualified on the appropriate evaluator CFETP tasks. (T-1)

5.9.1.4.2. Complete unit evaluator training program, to include at least one proficiency evaluation and one technical inspection. (T-2)

5.9.1.4.3. Be observed by Chief of QA, QA Superintendent or LCG Superintendent conducting a PPE or TPE. (T-2)

5.9.1.4.3.1. Chief of QA, QA Superintendent, or LCG Superintendent must observe each evaluator conducting a PPE or TPE annually, not to exceed 12 months between observations. (T-1)

5.9.1.4.4. Be interviewed by Chief of QA and LCG Superintendent. (T-2)

5.9.1.4.5. QA Augmentation. If a functional area does not warrant a full-time position in QA, but specialized expertise is required, select qualified personnel that are recommended by their SQ/CCs to be augmentees. Each QA must maintain a listing of current augmentees. (T-2) In coordination with the SQ CCs/SUPTs, QA shall establish augmentee duties.

5.9.1.4.6. Rotation of QA Personnel. Personnel should be assigned to QA for a maximum of 36 months/minimum of 24 months.

MINIMUM SAMPLING REQUIREMENTS

Table 5.1. Minimum Inspection/Evaluation Sampling Requirements.

ITEM	Quantity
PPE	- Initial PPE: within 90 days of initial qualification - Annually on each technician
TPE	- Annually on each instructor
T.O.s and local job guides (as required)	- 100% New and revised T.O.s - 100% T.O. and CEM change requests - 100% Local Job guides issued within LCG
Unit Lesson Plans	- 100% Annually for format and standardization (N/A for headquarters managed lesson plans)

ACCEPTABLE QUALITY LEVELS/STANDARDS

Table 5.2. Acceptable Quality Level (AQL) Grading Criteria.

RULE	If the Individual Committed	AND	Award a grade of
1	No major errors	The overall performance exceeded the acceptable level and no minor errors were assessed	Outstanding
2		No minor errors, or the accumulation of minor errors did not detract from	Satisfactory

		overall acceptable level	
3	One or more major errors	N/A	Unsatisfactory
4	No major errors	More than four (4) minor errors on a task observation	

Table 5.3. Error Criteria Description.

<u>**MAJOR ERROR:**</u>

-- Significant Safety Error. An error that, as a reasonable expectation, could result in personnel injury caused by an individual's disregard or lack of attention to safety precautions.

-- Significant Equipment Damage. An error that, as a reasonable expectation, could damage a support equipment, SV, LV or critical infrastructure system component to the extent it cannot be used for its intended purpose. This does not include damage to common hand tools.

-- Failure to have available/utilize T.O.**/approved contractor data/procedures while performing/observing maintenance.**

-- Individual not trained/certified on task being performed.

-- Failure to accomplish/observe a portion of a task that results in increased mission risk by not verifying the operability/serviceability of support equipment, subsystem, or system component.

-- Failure to document maintenance actions/conditions that, as a reasonable expectation, results in erroneous equipment availability, SV, LV or critical facility system status; or significant safety/security deficiency.

-- Failure to recognize an unacceptable condition/test result that is cause for rejection of equipment or prevents support equipment/system or system component from operating.

-- Failure to recognize an acceptable condition/test that caused rejection of serviceable components or equipment.

-- Clearly demonstrated inability to successfully complete the task due to a lack of job knowledge. Cannot correctly or safely accomplish task without excessive outside intervention or assistance.

-- Failure to comply with the intent of T.O.**/approved procedure warnings or cautions.**

-- A condition that creates an unreliable LV/SV, LV/SV component, equipment item, critical facility or an unsafe or insecure environment.

MINOR ERROR:

-- An error that does not prevent a support equipment/SV, LV, or critical facility system component from being used for its intended purpose, but would, as a reasonable expectation, have a detrimental effect on the operational life of the component, equipment or system. This may include damage to common hand tools due to misuse.

-- An error that, as a reasonable expectation, could require support equipment to be returned to another agency for recalibration/reverification.

-- An error that lacks the seriousness to meet the criteria for a major error.

ADDITIONAL TRAINER PROFICIENCY ERROR CRITERIA

MAJOR ERROR:

-- Failure to detect/correct a major error.

-- Failure to have available/utilize lesson plan.

-- Use of a lesson plan not reviewed within the past year.

-- Certified student(s) who fail to meet objective.

-- Failure to provide students with technically accurate information (consider the impact of the information).

MINOR ERROR:

-- Did not document training session.

-- Did not detect/correct a minor error.

-- Minor deviation from ISD process.

Chapter 6

TOOL AND EQUIPMENT MANAGEMENT

6.1. Tool and Equipment Management. The objectives of the tool and equipment management program are to prevent damage to weapon systems, space systems and support equipment, reduce costs through effective control and accountability, and ensure technicians are adequately resourced. The tool management program outlined in AFI 21-200 represents Air Force minimum program requirements and will be referred to for SL units tool and equipment management. (T-1) MAJCOMs may dictate additional requirements.

JUDITH A. FEDDER
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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

NOTE: Information contained in the following publications is useful to the space launch community. The list is not inclusive of all required directives, but is an excellent starting point to find needed information.

References

AFPD 21-2, *Munitions*, 17 Dec 2012

AFI 10-401, *Air Force Operations Planning and Execution,* 7 Dec 2006

AFI 20-101, *Integrated Life Cycle Management*, 7 Mar 13

AFI 20-111, *Logistics Compliance Assessment Program (LCAP),* 19 Apr 2011

AFI 21-103, *Equipment Inventory, Status and Utilization Reporting,* 26 Jan 2012

AFI 21-200, *Munitions and Missile Maintenance Management,* 2 Apr 2012

AFI 21-201, *Conventional Munitions Management*, 9 Apr 2014

AFI 21-203, *Air Force Consolidated Occupational Safety*, 15 Jun 2012

AFI 32-1065, *Grounding Systems,* 1 Oct 1998

AFI 36-2201, *Air Force Training Program*, 15 Sep 2010

AFI 63-101, *Integrated Life Cycle Management*, 7 Mar 2013

AFI 90-201, *The Air Force Inspection System,* 2 Aug 2013

AFI 91-204, *Safety Investigations and Reports*, 12 Feb 2014

AFMAN 48-155, *Occupational and Environmental Health Exposure Controls*, 1 Oct 2008

AFMAN 91-201, *Explosives Safety Standards*, 12 Jan 2011

AFMAN 91-202-AFI 91-202, *The US Air Force Mishap Prevention Program*, 5 Aug 2011

AFMAN 91-222, *Space Safety Investigations and Reports*, 9 Aug 2005

T.O. 00-5-1, *AF Technical Order System*, 1 May 2011

T.O. 00-5-19, *Security Assistance Technical Order Program,* 1 Jan 2010

T.O. 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policy and Procedures*, 1 June 2011

AFSPCMAN 91-710v6, *Range Safety User Requirements Manual Volume 6 – Ground and Launch Personnel, Equipment, Systems, and Material Operations Safety Requirements*, 1 Jul 2004

CFETP, *Career Field Education and Training Plans*: 2M0XX

EWR 127-1, *Eastern and Western Range Safety Requirements*, 31 Oct 1997

Abbreviations and Acronyms

AF—Air Force

AFCFM—Air Force Career Field Manager

AFI—Air Force Instruction

AFPD—Air Force Policy Directive

AFRE—Air Force Responsible Engineers

AFS—Air Force Specialty

AFSC—Air Force Specialty Code

AFSPC—Air Force Space Command

AFSPCMAN—Air Force Space Command Manual

AGE—Aerospace Ground Equipment

ALC—Air Logistics Complex

AQL—Acceptable Quality Limit

ASTS—Air and Space Test Squadron

CC—Commander

CCS—Superintendent

CFETP—Career Field Education and Training Plan

CFO—Chief Financial Officer

CLS—Contractor Logistics Support

COCOM—Combatant Command

CTK—Composite Tool Kit

DoD—Department of Defense

DoDAAC—DoD Activity Address Code

DSV—Detected Safety Violation

EPE—Evaluator Proficiency Evaluation

EWR—Eastern and Western Range

FAM—Functional Area Manager

FIM—Facilities Infrastructure Manager

FOD—Foreign Object Damage

GSE—Ground Support Equipment

HAI—Hardware Acceptance Inspection

HQ—Headquarters

HVAC—Heating, Ventilation and Air Conditioning

IAW—In Accordance With

ISD—Instructional System Development

JQS—Job Qualification Standard

LCG—Launch Group

LoA—Letters of Assignment

LoD—Letter of Delegation

LV—Launch Vehicle

LVMA—Launch Vehicle Mission Assurance

MAJCOM—Major Command

MA—Mission Assurance

MAT—Mission Assurance Technician

MI—Management Inspection

MX—Maintenance

NAF—Numbered Air Force

NCOIC—Noncommisioned Officer In Charge

NCOP—Nonconformance/Out-of-position work

OI—Operating Instructions

OPR—Office of Primary Responsibility

PE—Proficiency Evaluations

QA—Quality Assurance

QVI—Quality Verification Inspection

RMS—Range Management Squadron

RP—Real Property

RPIE—Real Property Installed Equipment

RSLP—Rocket Systems Launch Program

RT—Recurring Training

SI—Special Inspection

SL—Space launch

SLS—Space Launch Squadron

SMC—Space and Missile Systems Center

SMT—Space Launch Maintenance Technician

SUPT—Superintendent

SV—Satellite Vehicle

SVMA—Satellite Vehicle Mission Assurance

SW—Space Wing

TBA—Training Business Area

T.O.—Technical Order

TPE—Trainer Proficiency Evaluation

USAF—United States Air Force

UTC—Unit Type Code

U&TW—Utilization and Training Workshop

WWSMMC—World Wide Senior Munitions Manager's Conference

Terms

Acceptance—Government acceptance of the results of a contractor-executed test procedure or task and acceptance of close-out/disposition of all anomalies or out-of-family/out-of-spec data associated with that procedure or task. Acceptance will be performed by one, or a combination of the following agencies: System wing/group, SLS, and RMS (depending on the subject). The Aerospace Corporation will provide a technical recommendation on acceptance or rejection to the Air Force. Acceptance takes on two forms: One is an acceptance of items/processes/procedures as required by the contract; the other is technical acceptance that the contractor's actions have adequately resolved any anomalies/non-conformances and satisfies Flight/Task Certification Matrix requirements.

Aerospace Ground Equipment (AGE)—Ground processing end items that are required to make a space system operational, not designated as Special Tooling or other production tooling defined as being allocated to an airborne configuration item, and not designated as Real Property Installed Equipment.

Air Force Responsible Engineer (AFRE)— AFREs provide analysis of procedures, processing activities for technical risk assessment and verify these products and procedures adherence to safety requirements. AFREs may also perform maintenance/technical surveillance activities. Typically, AFREs are Air Force officers with engineering, acquisition or maintenance backgrounds.

Annual—When used as a requirement, the term annual refers to a 12-month interval (e.g., a PPE conducted on 15 Nov requires an annual evaluation conducted by 14 Nov the following year).

Anomaly—An unexpected or unplanned condition that does not meet provided system performance parameters and which cannot be corrected by organizational maintenance resources in accordance with validated procedures. After analysis, an —out-of-family condition could be declared an anomaly.

Anomaly Resolution—The process to resolve an anomaly. An anomaly resolution team will be formed to resolve/disposition all system anomalies. This team may consist of AFSPC, contractors, and any other personnel needed to resolve the anomaly

Approval—Approval signifies AFSPC approval/acceptance/coordination IAW AFSPC instructions and Memorandum of Agreements.

Combatant Command (COCOM)—Nontransferable authority established by Title 10, United States Code, Section 164, exercised only by commanders of unified or specified combatant commands. COCOM (command authority) is the authority of a Combatant Commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command.

Contract Administration/Surveillance—Active surveillance of contractor performance to ensure compliance with various contract or statement of work requirements. Examples include safety, quality assurance, security, property management, and base support. Surveillance tasks may be performed by the contracting office or delegated to another government office, which has resident expertise and/or is co-located with contractor operations.

Contract Management—Active management of the contract and/or contractor by the contracting officer for the purpose of ensuring satisfactory delivery of end items meeting USAF requirements. This includes such activities as contract negotiation and business clearance, as delegated by SMC.

Contractor Data—Contractor data is developed by the contractor for use in supporting T.O. development, production, Research and Development (R&D) programs, Interim Contractor Support, CLS, etc. It can contain all forms of technical data, including manuals, documents, pamphlets, instructions, engineering drawings, etc. Contractor data includes Factory Test Equipment and Special Test Equipment data. Air Force personnel may use contractor data when CLS/Contractor Support (CS) contracts specify Air Force assistance to the contractor or when operating or maintaining equipment at sites or locations not covered by the contract, for example, overseas and/or remote locations. No other authorization is required except for munitions manuals. If Air Force personnel are conducting munitions operations (munitions loading, handling, etc.), authorization is warranted by the respective Lead Command.

Critical System(s)—Critical systems are those that are necessary for a successful mission and are identified as having test/processing procedures that require direct government observation or data review.

Data Review—Government review of all data (measurement or statistics), resulting from completion of a contractor-executed test procedure or task, required for government acceptance of that test procedure or task. Data from contractor-run tests and procedures will be reviewed by SMC Systems Wings, SLS, and/or AFQA according to the Flight Certification Matrix. This data review is to ensure the test/procedure produced the desired results, to identify any anomaly/non-conformances, and to develop trend data.

Direct Support—Provide a comprehensive, structured, support process to bring workable systems to the customers. Maximize support of HQ functions to promote operational and administrative effectiveness.

Discrepancy—An unexpected or unplanned condition that does not meet system performance parameters but which can be corrected by organizational maintenance resources in accordance with validated procedures at the unit level.

Facilities—These electrical and mechanical systems are typically ―inside the-fence‖ and provide indirect support to Space and Launch Vehicles. Space launch processing buildings to include their electrical and mechanical systems that provide indirect support to space and launch vehicles. These systems include but are not limited to: Security systems, power systems, lightning systems, lighting systems, grounding systems, non-critical HVAC systems (non-flight hardware), communication systems, non-critical cranes, and structures.

Facilities Infrastructure Managers (FIM FIMs fulfill a vital role in the readiness and sustainment of mission critical ground systems of launch processing facilities both under the control and not under control by contractors. Critical infrastructure under the control of satellite or launch vehicle contractors include, but are not limited to, facility cranes, environmental control systems and fire detection/suppression systems. Critical infrastructure not under the control of satellite or launch vehicle contractors include, but are not limited to, base—wide power production/distribution, commodity pipelines and water pump stations.   FIMs assist launch group leadership in providing launch and sustainment risk assessments to associated program offices. FIM oversight responsibilities include tasks that are typically performed by 3rd party contractors and are not assigned a LVDB mission assurance category.

Flight Hardware—All physical elements of the space launch systems that lift off, in contrast to those space system elements that remain on the ground.

Flight Readiness—Assessment of the ability of the entire launch system (LV/SV, critical GSE/facilities/infrastructure, range systems, and AGE) to meet the current launch schedule.

Flight Readiness Review (FRR)—Provides SMC/CC with hardware and software mission status for the LV, the satellite, and/or critical ground systems, as well as associated interfaces. Required for all missions where the SMC/CC is responsible for the certification of the mission, LV, satellite or critical ground system, and FRR is presented to the SMC/CC or a designated representative. The briefing takes place following SV and LV integration.

Flight/—Flight Supervision is composed of a flight commander and/or a flight chief/OIC and NCOICs with sufficient background and knowledge required to manage sections under their authority in support of the mission.

Ground Support Equipment (GSE)—These electrical (EGSE) and mechanical (MGSE) systems are typically ―inside-the-fence‖ and provide direct support to the Space and Launch Vehicle. These systems include but are not limited to: SV and LV storage and handling equipment, launch mounting systems, propellant storage and transfer systems, critical cranes, critical environmental control systems, data processing systems, sound suppression systems, and umbilical/retractable systems.

Infrastructure—These electrical and mechanical systems are typically ―not under the control of satellite or launch vehicle contractors and provide indirect support to Space and Launch Vehicle Processing and Launch Facility. These systems include but are not limited to: Power ,pipelines, water supply, water disposal, roads, runways, and docks.

Insight—Government surveillance/analysis of contractor activities/engineering associated with delivery of a launch service. Contractor retains all cost control (via contract) and liabilities for mission success.

Job Order Number—A unique number assigned to an account that a contractor and the Government uses to charge program-related expenses (including labor and materials).

Launch Mishap—Any AF launch-related incident which results in damage to government or non-government property, illness or injury to or the death of government or non-government personnel, or failure of a USAF-managed launch system to deliver a satellite to its intended orbit. This includes but is not limited to catastrophic destruction of the launch vehicle, failures involving the upper stage delivery system, or an anomaly or degradation of a component or components resulting in mission failure.

Launch Processing—Launch site performance of engineering, test operations, processing/integration, and maintenance tasks associated with flight hardware/software, ground support equipment (GSE), and infrastructure to prepare the integrated stack (consisting of the LV, upper stage, and satellite) for space launch.

Launch Processing Management—Functions performed by the Space Wing and associated SMC representative to manage contractor launch processing actions in accordance with the contract and appropriate delegations.

Launch Service—Space launch capability provided by a contractor to place a satellite into a specified orbit. The contractor retains ownership of all flight and ground hardware, engineering analyses, processes, and readiness decisions.

Launch Vehicle Mission Assurance—LVMA is technical and management process rigorously, continuously, and iteratively employed over the life cycle of a launch system (mission conception to space vehicle separation) to maximize mission success. LVMA encompasses system engineering, risk management, quality assurance, and program management by an experienced, stable launch agency team. LVMA is achieved through integrated developmental processes and/or independent technical assessment and requires expenditures commensurate with the criticality of the mission and the consequences of failure.

Life Cycle Systems Engineering—Process for establishing and preserving the safety, suitability, and effectiveness of Air Force systems and end-items over the entire operational life by preserving technical integrity via prudent use of disciplined engineering practices, assurance of proper operations and maintenance, effective supply systems, and field utilization and maintenance trends feedback to systems program offices.

Launch Verification Matrix—A detailed description of all flight-critical hardware and software test procedures and tasks, the execution of which must be personally observed by a government representative and/or be approved through appropriate data review.

Maintenance Functions—Launch base transport, assembly, checkout, preparation, corrective

maintenance, and preventative maintenance inspections of space launch vehicles, payloads, space launch complexes, support equipment (SE); and real property (RP) that support launch activities. Includes MATs and AFREs performing surveillance of contractor launch processing activities to assess risk and suitability of contractor—performed actions.

Maintenance Surveillance—Observations and activities conducted by SLS personnel to include Contract Surveillance, which are used to ensure/determine if launch system assets are reliable and ready for operation by ensuring adherence to technical procedures, general maintenance practices, safety requirements, security guidelines, environmental compliance, efficient

utilization of resources, and resource safety to include directing an immediate halt to actions detrimental to personnel or equipment.

Mission Assurance Technician (MAT)—Perform maintenance/technical surveillance activities. They review space launch processing procedures, monitor launch processing activities, provide risk assessments and documentation for LVMA and SVMA through maintenance/technical surveillance of launch processing activities. Typically, MATs are from the 2M0XXs career field with specific missile maintenance knowledge and experience.

Nonconformance Out of Position work (NCOP)—- NCOPs arise from significant issues experienced during processing or unplanned work. Coverage is determined based upon a risk-based technical assessment following SMC approved guidelines for determining task categorization.

Observation—Direct government observation of the execution and recording (if applicable) of a test procedure or task. An "observed" test procedure or task is one in which all steps (or certain pre-defined steps) have been completed, all anomalies have been noted (with appropriate documentation generated), and all applicable data captured while being observed by a government representative. Observed test procedures or tasks are typically those that must be accomplished correctly, cannot be easily verified by data review or post-test, and include a high risk of inducing collateral damage that could remain undetected.

Oversight— Government surveillance/analysis and control of contractor activities/engineering associated with delivery of a launch service. Government assumes liabilities for costs and mission success.

Public Safety—Safety involving risks to the general public of the United States or foreign countries and/or their property.

Range Operations—Any procedure that requires the use of Range resources. The execution of operations focused on efficient and coordinated employment of all range assets and processes to enable the safe and timely launch of payloads and test vehicles.

Real Property (RP)—Land, buildings, structures, utilities, improvements and appurtenances thereto. Includes equipment attached to, and made part of, buildings and structures but not movable equipment. Primarily consisting of facilities and other non-equipment support system infrastructure.

Real Property Installed Equipment (RPIE)—Government-owned or leased support equipment, apparatus and fixtures that are essential to the function of the real property and permanently attached to, integrated into or on government-owned or leased property.

Readiness Reviews—A review to assess the readiness status of any or all aspects of mission or launch readiness elements directed by the Commander, AFSPC.

Resource Protection—The protection of Air Force flight hardware, facilities, support equipment, or other property from damage due to mishaps.

Responsible Engineer—Personnel who perform technical risk assessments for mission assurance through engineering analysis of launch processing activities. Documents engineering analyses. Typically, REs are contractors with extensive space launch processing experience.

Risk Assessment—Actions conducted for mission assurance purposes to (1) identify and capture risk items from procedure review and process observation, (2) assign a technical risk level to each item, and (3) track each item through resolution/mitigation steps to acceptance or closure.

Satellite Vehicle Mission Assurance—SVMA is a technical and management process rigorously, continuously, and iteratively employed over a space vehicle until it successfully separates from a launch system in its intended orbit. SVMA encompasses system engineering, risk management, quality assurance, and program management by an experienced, stable space vehicle agency team. SVMA is achieved through integrated developmental processes and/or independent technical assessment and requires expenditures commensurate with the criticality of the mission and consequences of failure.

Space launch—The ability to project power by transporting people and materiel to and/or through space, to include test launches and sub-orbital missions. This includes the deployment, sustainment, and augmentation of satellite constellations by delivering space systems to the required orbit.

Space launch maintenance—Maintenance function conducted by USAF or contractor personnel at the launch base in support of operations to attain and maintain the capability to command, control, and execute a space launch system.

Space launch Maintenance Technician (SMT)—Personnel who perform handling and maintenance of flight hardware, and operate and maintain support equipment, vehicles, and facilities. They are typically from the 2M0XX career field with specific missile maintenance knowledge and experience. SMTs are personnel assigned to 1 ASTS.

Support Equipment (SE)—All equipment (i.e., AGE, RPIE, etc.) required to make or keep a space launch system, subsystem or item of support equipment operational in its intended environment.

Verify—To review, inspect, test, check, measure, audit or otherwise confirm that products, processes, or documents conform to specified requirements. Verification may be performed after work completion, e.g., safety wiring.

Attachment 2

TRAINING REQUIREMENTS

Table A2.1. MAT/AFRE/SMT/FIM Training Requirements.

Training	Applies To	Frequency	OPR	Remarks
Maintenance / OSS&E Training	All FIM/MAT/ AFRE/SMT	One time	Unit Training	Ensure personnel understand AFI 21-202V3, AFI 63-1201.
Corrosion Control Training	All FIM/MAT/ AFRE/SMT	Annual	Unit Training	Ensure an understanding of how to identify, treat, and prevent corrosion.
Environmental Awareness Training	All FIM/MAT/ AFRE/SMT	One time	Unit Training	29CFR1910.1200
Cardiopulmonary Resuscitation (CPR)/First Aid	All FIM/MAT/ AFRE/SMT	CPR Locally defined First Aid – Initial / Every two years	Unit Training	OSHA Standard 1910.151, 1910.269(b) (1) and AFI 36-2238
Explosive Safety	All FIM/MAT/ AFRE/SMT	Initial / Annual	Unit Training	Ensure all personnel understand explosive safety standards required during processing and launch. Local explosive safety course (initial class) will fulfill this requirement IAW AFI 91-202
Propellant Training	All FIM/MAT/ AFRE/SMT	Initial / Annual	Unit Training	AFSPCMAN 91-710/AFOSH Standards 91-67 and 48-8
Confined Space Training	All FIM/MAT/ AFRE/SMT	Annual	Unit Training	AFOSH Standard 91-25
Overhead Crane Safety Training	All FIM/MAT/ AFRE/SMT	One time	Unit Training	AFOSH Standard 91-46, Chap 5

Training	Applies To	Frequency	OPR	Remarks
Rigging Fundamentals Training	All FIM/MAT/ AFRE/SMT	One Time	Unit Training	Usually provided through contractor training
Fire Extinguisher Training	All FIM/MAT/ AFRE/SMT	Annual	Unit Training	AFOSH Standard 91-501
Complex/Facility Safety Training	All FIM/MAT/ AFRE/SMT	Initial / Every 3 years	Unit Training	AFSPCMAN 91-710V1
Process Safety Management	All FIM/MAT/ AFRE/SMT	Every 3 Years	Unit Training	EWR 127-1, Chap 6 or AFSPCMAN 91-710, Vol 6, as applicable
Basic contract, Statement of Work (SOW) and Memorandum of Assignment (MOA) familiarization	All FIM/MAT/ AFRE/SMT	Initial	Unit Training	Contracting Office, AFI 63-124/AFI 63-501 and applicable supplements. This training is intended to provide all SLS maintenance and engineering personnel with basic contract familiarization training due to the day-to-day interactions with contracts / contractors
Spacelift Fundamentals Course	Newly assigned personnel	One Time	AFSPC/ A4MM	Not a prerequisite to performing mission assurance duties, however it should be completed as soon as possible after assignment.
Contractor Provided Training	All FIM/MAT/ AFRE/SMT	As Required	Unit	None